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ABSTRACT

A questionnaire survey was used at Southern California University, Berkeley in which 140 faculty members gave their opinions about the problems and pleasures in teaching large lecture classes (minimum 100 students). Faculty members were also queried about their practices in dealing successfully with problems and their recommendations for administrative action. The three most common teaching problems identified were: the diversity of students' levels of ability (47%); knowing how well students are understanding (41%); and the low level of student reading and writing abilities (39%). The three most common non-teaching problems identified were: dealing with incompletes, make-up exams, or grade change requests (40%); too few teaching assistants (TAs) (36%); and unreliable equipment (28%). The efficient use of faculty time and the large numbers of students exposed to high-quality teaching and senior faculty members were viewed as the benefits of large classes. The faculty gained personal satisfaction from lecturing large numbers of students. Among the recommendations were: (1) provide funding for more TAs; (2) set an enrollment limit in lecture classes; (3) develop teaching idea packets for large classes; and (4) provide instructors of large classes with lighter teaching loads. An appendix provides the questionnaire and the frequency distribution of responses. (GLR)

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FACULTY VIEWS OF FACTORS THAT AFFECT TEACHING EXCELLENCE IN LARGE LECTURE CLASSES

Robert C. Wilson and Caroline Tauxe
Research on Teaching Improvement
and Evaluation

Sponsored by the

Council on Educational Development

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Research on Teaching Improvement and Evaluation
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Executive Summary

The purpose of the study reported here was to discover faculty opinions about the problems and pleasures in teaching large lecture classes. We also asked them about their practices in dealing successfully with the problems and their recommendations for administrative action. We were also interested in what they regarded as the academic advantages of large lecture classes and what specific satisfactions they derived from teaching such classes. One hundred and forty (140) ladder faculty responded to our questionnaire.

The questionnaire asked faculty to rate the degree to which they felt each of the 32 potential problems was a problem in teaching large lecture classes. We also asked them five open-ended questions:

1. Please list additional problems that have not been covered.
2. What has been your most successful solution to one of your most difficult problems?
3. What broad administrative actions do you recommend that would improve large lecture courses?
4. What are the academic advantages of the large lecture format?
5. What are the specific sources of satisfaction for you in teaching large lecture courses?

The three most common teaching problems were:

- Diversity of students levels of ability (47%) 66
- Knowing how well students are understanding (41%) 58
- Low level of student reading and writing abilities (39%) 54.

The three most common non-teaching problems were:

- Dealing with incompletes, make-up exams, or grade change requests (40%) 56
- Too few TAs (36%) 51
- Unreliable equipment (e.g. microphones, projectors) (28%) 39.

The two most commonly mentioned advantages of the large lecture format were:

- Efficient use of faculty time

- The possibility for large number of students to be exposed to high-quality teaching and senior faculty members.

The two most commonly mentioned sources of satisfaction were:

- the excitement and drama of large lecture performances
- the feeling of satisfaction after giving a really good lecture (the excitement of feeling you are getting across to students).

Following are recommendations faculty made ofr overcoming teaching problems as well as non-teaching problems of large lecture courses.

- Establish a pre-semester workshop for first-time large lecture course teachers.
- Arrange for a brief seminar about "How to construct and grade exams for large lecture classes".
- Convene an interest group for first-time large lecture course teachers.
- Develop Teaching Idea Packets (TIPs) for Large Lecture Classes.
- Involve more senior faculty in teaching large lecture courses.
- Rewrite the large lecture course descriptions.
- Publish a brief Guide to Writing Course Descriptions.
- Upgrade the equipment and physical maintenance of rooms used for large lecture courses.
- Establish a better system for matching large lecture classes to appropriate sized rooms and equipment.
- Provide funds to departments for hiring course managers for very large courses.
- Support the development and departmental adoption of data management systems to do the clerical work of large lecture courses.
- Provide a pool of money that large lecture teachers can apply to for assistance with unusual class expenses.
- Provide adequate funding for more TAs.
- Set a limit on enrollment in large lecture classes.
- Improve the new Advance Class Enrollment (ACE) system.
- Instructors of large lecture classes should be given a lighter teaching load.

FACULTY VIEWS OF FACTORS THAT AFFECT TEACHING EXCELLENCE IN LARGE LECTURE CLASSES

Robert C. Wilson and Caroline Tauxe
Research on Teaching Improvement and Evaluation/TIES

Purposes of the Study

This report summarizes the results of a questionnaire survey of faculty views about issues in conducting large lecture classes. One hundred and forty professors who conducted such classes during 1983-84 or 1984-85 gave us their opinions and recommendations.

Faculty gave us their opinion about problems in teaching and conducting large lecture classes. In addition, they described what they do to overcome some of these problems. They also recommended some administrative actions that would improve large lecture classes.

It is important and useful to distinguish between the behavior required to promote teaching excellence in large lecture classes and the behavior required to promote excellence in conducting large lecture classes. The first involves the intellectual presentation of subject matter, while the second involves the many housekeeping details intrinsic to the daily management of large lecture classes.

Section I of this report describes those aspects of teaching large lecture classes that faculty consider to be problems in helping students learn the

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This project was initiated in May, 1985. It was sponsored by the Council on Educational Development, chaired by Professor Hugh Richmond and supported by Watson M. Laetsch, Vice-Chancellor for Undergraduate Affairs.

concepts and facts of a subject. It also describes how teachers can serve as models of the ways scholars in their fields function intellectually as they think about issues in the discipline.

Section II of the report describes the problems of conducting large lecture classes and how faculty devise means to cope with the myriad administrative and management chores. As the report points out, faculty are aware of their own responsibilities in this area, but many feel that other members of the campus community (i.e. administrators) have important roles in the successful conduct of large lecture classes. They make some recommendations regarding these roles that could greatly improve large lecture classes.

Section III of the report describes the positive aspects of teaching large lecture classes. Many faculty describe the rewards of teaching large numbers of diverse students; the stimulation it brings to their teaching and to other members of their classes. Others point up the economic and administrative advantages.

Faculty were asked about the extent to which they felt certain potential teaching problems (e.g., diverse levels of student preparation and ability, lack of student feedback) were problems in teaching large lecture classes.

The questionniare also included questions about potential non-teaching factors that can sometimes present difficulties in conducting large lecture classes; for example, unreliable equipment, not enough money to pay for handouts, heavy administrative and paperwork load.

They were also asked about what specific sources of satisfaction they had in teaching large lecture classes and what they felt were the academic advantages of such classes.

Faculty also reported on their successful practices in meeting difficult problems and made recommendations for administrative actions that would improve their large lecture classes.

Methods and Procedure

For the purposes of this study we have defined "large lecture" class as one enrolling at least 100 students. We obtained a listing of all such courses taught on the Berkeley campus from Fall 1983 through Spring 1985.

Faculty Interviews

A search of the education literature and informal discussions with a few faculty members who had conducted large lecture classes enabled us to identify some general areas of concern. This information was used to develop an open-ended interview schedule in which a series of topics were presented for comment these included: preparing lectures; working with teaching assistants; assignments and exams; administration of the course; having a large number of freshmen students; departmental decisions related to large lecture classes; and personal feelings and attitudes towards teaching such classes. Interviewees were encouraged to talk about additional issues and also about the positive aspects they had experienced teaching large lecture classes. The interview schedule also asked for suggestions on ways to improve the conduct and teaching of classes with large enrollments.

Over the course of the Spring 1985, we had formal interviews with ten U.C. Berkeley faculty representing a wide range of disciplines who are experienced large lecture teachers. These interviews were also wide ranging, providing us with valuable qualitative data. This qualitative data helped

us to focus on additional issues.

The Survey Questionnaire

Based on what we had learned from the literature review and interviews, we developed a survey questionnaire to discover some of the factors that affect teaching excellence in large lecture classes (see Appendix). It was sent to all U.C. Berkeley faculty who had taught large lecture classes between Fall 1983 and Spring 1985. The Teaching Excellence in Large Lectures (TELL) questionnaire asked faculty members about each of 32 potential problem areas that sometimes make teaching large lecture classes difficult, e.g. Diversity of student levels of ability, Lack of proper equipment in assigned classroom, Too few TAs. Faculty were asked to mark their opinions on a 5-point scale with 1 meaning not a problem and 5 meaning a major problem. There was also a place for marking not applicable.

The TELL questionnaire also included five open-ended questions with space for written responses. These were:

1. Please list additional problems that have not been covered.
2. What has been your most succesful solution to one of your most difficult problems?
3. What broad administrative actions do you recommend that would improve large lecture courses?
4. What are the academic advantages of the large lecture format?
5. What are the specific sources of satisfaction for you in teaching large lecture classes?

The Sample

Our first mailing was to all those teachers of large lecture classes with freshmen enrollments of 50 or more. This group included 150 faculty, of which 49 responded by completing and returning the questionnaire. The non-

respondents were sent a follow-up letter and questionnaire, to which 23 responded, for a total response of 72, or 48%. An additional mailing was sent to those faculty who taught large lecture courses with freshman enrollments of under 50. There were 175 faculty members in this group. No follow-up letter was sent, and the response was 68, or 31%. Thus, a total of 325 faculty were sent survey questionnaires of which 140 responded, or 43%. Only ladder rank faculty were surveyed.

Contextual Variables

Three contextual variables were of particular interest to us in this study: we wished to find out how the problem profile varied with the parameters of discipline, freshmen enrollment, and total class size. From previous studies we knew that the meaning of our data might be different in different contexts.

Twenty-seven departments were represented by our survey respondents. These were coded into 10 disciplinary groups, according to a classification system adapted from one used by the U.C. Berkeley Office of Institutional Research.

Number of Respondents	Disciplinary Group
37	Social Sciences, Ethnic Studies and Special Programs
27	Physical Sciences and Math
24	Humanities
19	Biological Sciences
11	College of Chemistry
8	College of Engineering
5	Professional Schools
3	College of Natural Resources
2	College of Environmental Design
2	Health Sciences
2	Unknown (questionnaire returned unsigned)

Because of their small sample size, those disciplinary groups represented

by fewer than ten respondents were excluded in statistical analysis.

The enrollments employed in the analysis were those of the large lecture course most recently taught by each survey respondent. These were coded into the following groupings:

Freshmen Enrollment	Number of Respondents	Total Enrollment	Number of Respondents
0 - 10	34	100 - 199	61
11 - 99	47	200 - 299	34
100 - 199	33	300 - 399	20
200 - 299	10	400 -	22
300 -	12		
TOTAL	136	TOTAL	137

In the following discussion of results, these contextual variables will be mentioned only when they were significantly related to our findings.

RESULTS

I. Teaching Problems and Solutions

Responses were tabulated for each of the 32 potential problem areas (see Appendix B).

To summarize faculty members' level of concern about a problem area, adjacent categories of responses were combined:

Response Category	Levels of Concern about the Problem
4, 5	A definite concern
2, 3	Some concern
*0, 1	Not a concern

*0 = Not applicable

Items were rank ordered by the number of faculty who rated them 4 or 5, A definite concern (see Table 1). The item ratings are presented as proportions in Table 2.

This section discusses faculty members' responses to five major kinds of potential teaching problems. These include difficulties arising because of the diversity of students' levels of preparation and ability; need to know how well students understand what is being presented in a class; desire to get students to participate actively in a large class; issues about preparing and presenting lectures, and difficulties in preparing exams; grading student performance, and students cheating on exams or assignments.

TABLE I: Frequency Distribution of Faculty Concerns in Teaching Large Lecture Courses

Question	Not a Concern (0-1)	Some Concern (2-3)	A Definite Concern (4-5)
1. Diversity of student levels of ability	14	60	66
2. Knowing how well students are understanding	20	62	58
3. Dealing with incompletes, make-up exams, or grade change requests	20	64	56
4. Low level of student reading and writing abilities	21	65	54
5. Too few TAs	50	39	51
6. Lack of feedback from students	30	64	46
7. Low attendance at office hours	42	54	44
8. Low general knowledge among students	30	69	41
9. Unreliable equipment (e.g. microphones, projectors)	65	36	39
10. Student reluctance to ask questions in class	31	71	38
11. Poor physical maintenance of classroom	56	46	38
12. Writing recommendations for students you don't know	48	55	37
13. High level of organization required to lecture to a large group	54	51	35
14. Lack of proper equipment in assigned classroom	74	35	31
15. Inappropriate size of classroom	65	45	30
16. Not enough money to pay for handouts	73	37	30
17. Not enough money to pay for projection materials, films etc.	75	35	30
18. Low lecture attendance by students	30	83	27
19. TAs who do not know the subject as well as you would like	54	60	26
20. Class lists arriving too late	67	47	26
21. Cheating on exams and assignments	32	83	25
22. Superficiality of topic due to breadth of course	52	64	24
23. Low student interest in required courses	53	67	20
24. Excessive paperwork in grade reporting	62	58	20
25. Keeping students' attention	52	72	16
26. Inaccurate class lists	65	59	16
27. TAs with poor English language skills	72	52	16
28. Insufficient TA training resources	76	48	16
29. Dissatisfaction with TA selection procedures	90	38	12
30. Poor TA lecture attendance	90	40	10
31. Lack of coordination between lecture and section teaching	76	55	9
32. Discomfort in facing a large audience of students	105	28	7

TABLE 2: Distribution of Faculty Concerns in Teaching Large Lecture Courses in Proportions

Question	Not a Concern (0-1)	Some Concern (2-3)	A Definite Concern (4-5)
1. Diversity of student levels of ability	.10	.43	.47
2. Knowing how well students are understanding	.14	.44	.41
3. Dealing with incompletes, make-up exams, or grade change requests	.14	.46	.40
4. Low level of student reading and writing abilities	.15	.46	.39
5. Too few TAs	.36	.28	.36
6. Lack of feedback from students	.21	.46	.33
7. Low attendance at office hours	.30	.39	.31
8. Low general knowledge among students	.21	.50	.29
9. Unreliable equipment (e.g. microphones, projectors)	.46	.26	.28
10. Student reluctance to ask questions in class	.22	.51	.27
11. Poor physical maintenance of classroom	.40	.33	.27
12. Writing recommendations for students you don't know	.34	.39	.26
13. High level of organization required to lecture to a large group	.39	.36	.25
14. Lack of proper equipment in assigned classroom	.53	.25	.22
15. Inappropriate size of classroom	.46	.32	.21
16. Not enough money to pay for handouts	.52	.26	.21
17. Not enough money to pay for projection materials, films etc.	.54	.25	.21
18. Low lecture attendance by students	.21	.60	.19
19. TAs who do not know the subject as well as you would like	.39	.43	.18
20. Class lists arriving too late	.48	.34	.18
21. Cheating on exams and assignments	.23	.59	.18
22. Superficiality of topic due to breadth of course	.37	.46	.17
23. Low student interest in required courses	.38	.48	.14
24. Excessive paperwork in grade reporting	.44	.41	.14
25. Keeping students' attention	.37	.51	.11
26. Inaccurate class lists	.46	.42	.11
27. TAs with poor English language skills	.51	.37	.11
28. Insufficient TA training resources	.54	.34	.11
29. Dissatisfaction with TA selection procedures	.64	.27	.09
30. Poor TA lecture attendance	.64	.29	.07
31. Lack of coordination between lecture and section teaching	.54	.39	.06
32. Discomfort in facing a large audience of students	.75	.20	.05

A. Diversity of Students' Levels of Preparation and Ability

The most common among the 32 difficulties presented to professors teaching large lecture classes, were those related to levels of student preparation and ability. Three different items on this topic were included on the Teaching Excellence in Large Lectures (TELL) questionnaire, and all ranked among the ten most common concerns out of the 32 presented (see Table 2). These included Diversity of student levels of ability, which was seen to present a teaching problem by 47% of our sample; and Low level of student reading and writing abilities, seen as a problem by 39%; and Low general knowledge among students, was a problem for 29%.

Professors' comments bring out various aspects of these problems:

> "One problem is that some students can't read at a high level and their writing skills are so poor. This is not due to class size, but in large lectures you don't have time to go over the reading as much, since some students are more advanced." (Anthropology)
>
> "Students do not have the necessary prerequisites, but they take the course anyway. They complain about the material 'being too hard'." (Physics)
>
> "I don't know what my students are capable of. I don't know if they can all do high school algebra." (Mathematics)
>
> "Often the big courses are the first courses students take at Berkeley. This puts a severe strain on their study skills, complexity management, etc. Some students never catch up with those who have the resources to manage themselves." (Computer Science)

The number-one-ranked potential problem on the TELL questionnaire, Diversity of student levels of ability, was rated 4 or 5, a definite concern, by 66 out of 140 faculty members (47%). Among those disciplinary groups with more than ten respondents, the percent indicating a definite concern varied from 27% in the College of Chemistry to 59% in Physical Sciences and Mathematics and 54% in Social Science. Ratings of this item did not vary

significantly with class size, nor with numbers of freshmen enrolled.

Ratings of Low level of student reading and writing abilities showed a similar pattern. Fifty-four out of 140 faculty (39%) rated this as a definite concern. Among the discipline groups represented by more than 10 respondents only one of the College of Chemistry faculty (9%) ranked this item as a definite concern. Social Science and the Humanities had the greatest numbers of faculty (54%) marking this a definite concern. These results are not unexpected since Humanities and Social Science courses usually require more extensive and difficult reading and writing tasks. This item also did not show a significant relationship to class size or number of freshmen enrolled.

The item Low general knowledge among students was marked a 4 or 5 by 41 out of 140 faculty members (29%). Again, among those disciplines represented by more than 10 responses, this problem was perceived to be a definite concern by 50% of faculty in the Humanities. Of faculty in Biological Science only 21% marked a 4 or 5. Of faculty in the College of Chemistry only 11% or 1 marked it a definite concern. It may be that what faculty understand by "general knowledge" varies according to their fields. They may also differ in their expectations about their students' general knowledge. Faculty in Chemistry know that most of their students have little knowledge related to their field and don't expect their students to understand contextual references without explanation. Faculty teaching American Literature, however, may well make assumptions that almost all of their students will understand references to Tom Sawyer or Mickey Mouse. Some of these faculty may be finding this assumption incorrect. As with the other items discussed here, there was no significant variation by class size or freshmen enrollment.

Faculty members described actions that they regarded as successful ways of solving the problems of dealing with student diversity:

> "We tightened the organization of labs and TAs: the good students hate it, but the average level of performance has increased. We now have specific "deliverables" for every two hours of lab. It doesn't reward imagination, but keeps everyone together - reminiscent of 'basic training' in the military. Sad, but effective." (Computer Science)
>
> "Our faculty members specify objectives clearly in their class description ahead of time so students have a better way of making informed choices among instructors and self-selection into courses." (Psychology)
>
> "I try to respect the intelligence of my students; pitch my best to the best; I don't worry about those that shouldn't have taken the course; I am enthused about the subject myself." (Geography)
>
> "I pare down my reading list and make writing assignments very specific." (Philosophy)
>
> "I direct my lecture to freshmen. There is a difference of knowledge by generations -- they see the world differently, e.g., in my discussion of China, I found I couldn't assume basic knowledge of world historical events that my generation knows about."
>
> "I aim at the average student. I have to let the low ability ones fail, but I direct 10-15 minutes of each lecture to the best students." (Mathematics)
>
> "I give a variety of kinds of questions (TF, mult. choice, essay, fill in the blank) because different students excel in different ways." (Astronomy)
>
> "I simplify complex material -- compromise. I try to avoid unnecessary theory." (Geography)

B. Lack of Feedback from Students and Knowing How Well They are Understanding

In many large classes faculty lecturers have little individual contact with their students. In most cases, discussion and lab sections which offer better opportunities for feedback because of smaller size, are taught by graduate students and professors receive little first-hand information about students' responses to their lectures. This lack of feedback is frustrating to some faculty and makes it difficult for them to know if

their students understand the lectures.

Two of the items on the TELL questionnaire addressed this issue, and both ranked among the top 10 of the 32 problems. Of the 140 respondent faculty, 58 or 41% rated the item Knowing how well students are understanding as 4 or 5, A definite concern on a scale from 1 to 5, making it the second most common problem. Lack of feedback from students was rated as A definite concern by 46 faculty (33%), and ranked sixth. Several respondents elaborated on their experiences with this problem:

> "The size of my class, about 700 students, was a problem. I don't have first hand contacts with students. Little feedback. I don't know when I'm getting through." (Anthropology)
>
> "I feel no intimacy or feedback -- they're an audience." (Mathematics)
>
> "Theoretically, anything could be taught in a large lecture course, but it's hard to tell when they are getting it." (Mathematics)
>
> "This class has bad student/teacher relations, bad communication. Because of the TAs, I am the last person students come to, and no amount of cajoling will change this." (Sociology)

The average (mean) response to both of these items did not vary significantly across any of the contextual variables of total size, number of freshman enrolled, or disciplinary area.

Following are responses to the question What has been your most successful solution to one of your most difficult problems? Berkeley faculty have used several techniques for counteracting this lack of feedback.

> "A problem I have felt is a lack of proximity to the students because of the size of the course and the use of TAs. I plan to teach one discussion section myself next year." (Art History)
>
> "I have weekly (regular) meetings with TAs to inform them of issues covered in lectures and I obtain feedback about assignment performances and students' understanding of different topics." (Business Administration)

"I make personal appeals in lecture for students to attend office hours and provide feedback." (Business Administration)

"I hand out index cards several times during the semester asking students: "How's it going"; "Any suggestions?" (Chemistry)

"I rotate discussion sections with my TAs to get more feedback." (Physics)

"I open an optional field course (usually 25% attend) and this gives me a chance to get to know the students better." (Geography)

"When students don't ask questions I call on them to answer questions. I call in groups to my office hours so that I can attempt to meet each student at least once." (Physiology-Anatomy)

"We promote wide faculty participation in sections (>30 students discussion meetings) to eliminate student feeling that they never get near a faculty person in a situation in which questions can be asked." (Chemistry)

"I find out from TAs what the students are not getting from the lectures." (Philosophy)

"Students asking irrelevant questions gives some feedback." (Anthropology)

"I stay after class to talk with students and clarify the lecture." (Geography)

"I talk with students whenever I can. I sit with them before class, and I invite them up to my office. I try to answer questions and be available. I have a question time before lecture." (Astronomy)

"In longer lectures (80 minutes) I take 5 minutes for a question break." (Sociology)

"I used to have an open house to meet students, but can't anymore since I now have a small apartment." (Linguistics)

C. Student Participation in the Class and Interaction with Faculty

Some students value the personal element of small classes, the opportunities to get to know both the teacher and their fellow students, and to be known by them in return.

To what extent are large lectures characterized by impersonality and low student engagement?

Four of the TELL questionnaire items were related to these issues. Two of these items ranked among the 10 most common problems. Low attendance at office hours (ranked 7th) was marked as 4 or 5 by 44 faculty, 31% of our respondents. Students' reluctance to ask questions in class, ranked 10th, was marked as a definite concern by 38 faculty (27%). Low lecture attendance by students was a problem to fewer faculty, 27 or 19%, as was Low student interest in required courses, 20 (14%).

Respondents commented on various aspects of the problem of student participation in their large lecture class:

> "It is more difficult to elicit student reactions in a large lecture setting." (Geography)
>
> "The lack of student-faculty interaction during lectures: verbalizing material and receiving immediate feedback from the faculty is a critical part of the learning process that does not take place in large courses." (Political Science)
>
> "A big problem is that students are reluctant to raise questions. This lecture is only 50 minutes, so there is no time for a regular question period. Only 5 minutes for questions." (Sociology)
>
> "Students come to my office only at exam times." (Geography)

Returning to the analysis of responses to the four questionnaire items, we find little variation across discipline groups.

The mean response to these four items generally rose with increasing class size. A similar pattern was present when we looked at variation by number of freshmen enrolled.

The following are ways faculty members made an effort toward increasing student participation in large lecture classes:

> "Given students' reluctance (fear) to open any discussion, I provide written questions on the specific topic. I interrupt my lectures with specific questions requiring the students to think and to respond: active not passive audience." (Social Science)

"Asking questions at large is a disaster: The same 10 smart-alecks always answer and everyone else gets bored and mad. Instead, I ask questions of everyone. I follow a fixed pattern (row-by-row) that continues each day. Shy students can avoid being asked by changing seats. Also, I explain this won't affect their grade." (Computer Science)

"Make sure that every large class has a course center where student-student and student-professor learning can take place at many different hours of the week." (Physics)

"When students don't ask questions I call on them to answer questions" (Physiology-Anatomy)

"I try hard to get students to come and talk -- repeated announcements of office hours, etc. It really doesn't work that well." (Biochemistry)

"Refusing to use Black Lightning does increase student attendance. Making the midterm optional and refusing to give a make-up midterm helps -- students can decide whether they want their grade based solely on the final. Does great things for class spirit and environment." (Paleontology)

D. Preparing and Presenting Lectures

Another set of potential problems presented by large lecture classes revolves around the lectures themselves. Four items related to this issue were included in the questionnaire, but only one of them ranked among the 20 most common problems: High level of organization required to lecture to a large group. Thirty-five faculty marked this item 4 or 5, which ranked 13. Three other items, Superficiality of topic coverage due to breadth of course (24 faculty marked this item 4 or 5, and it ranked 22), Keeping students' attention (ranked 25) and Discomfort in facing a large audience of students (the lowest ranked item of all) present a difficulty to fewer faculty teaching large lecture classes, although several made suggestions of ways to overcome these problems.

Several faculty respondents described ways they prepare and present

lectures given the limitations of classes with large enrollments:

"I try to give the straight truth, not textbook approximations, give approximations, give a sense of proportion for judging the importance of various special topics, pace the learning process at a reasonable rate." (Mathematics)

"The lecture had to be formally prepared and written out. Very well prepared, not chatty." (Anthropology)

"I chose not to go in depth in any topic, but to give the students a point of view applicable across topics. The theme was ways of conceptualizing social issues, not on how much data you can get together." (Sociology)

"I redo a third of the course every year to keep it fresh." (Geography)

"I keep a constant flow of new and different visual materials--avoiding intricate detail." (Statistics)

"Lack of interest after two hours: I try to change pace and even have little surprises sometimes. --computer demonstrations; true life stories; visual aids." (Computer Science)

"Organization of lectures so students know where I am in the lecture--I write an outline of the lecture on the board." (Physiology-Anatomy)

"There are no easy solutions. Just hard work making sure lectures are perfectly organized and presented enthusiastically." (Economics)

"I add slides and guest speakers to supplement lectures--in order to increase student attentiveness." (Environmental Science)

"The success of the course depends almost entirely upon the skill of the lecturer and the care with which lectures have been prepared." (Chemistry)

"I use videotapes to show laboratory procedures to student." (Chemistry)

"An informal atmosphere and a little humor go a long way towards keeping students' attention. Getting in the habit of telling a joke or two in every lecture, about at the half-way point, worked pretty well for me." (Mathematics)

E. Exams, Grading and Cheating

Although our questionnaire did not emphasize exams, grading and cheating, many respondents cited them as major problems:

"My most difficult problem is to design interesting, thorough and

objective examinations for such large diverse groups." (Anthropology)

"I have difficulty ensuring equity in grading across TAs." (Political Science)

"I have no idea of the relation between the numerical score and what the students actually know." (Mathematics)

"Certain sloping classrooms (e.g. 100 Lewis) made cheating on tests very easy. It's hard to hold midterm and final reviews because buildings are usually locked at 5 p.m." (Computer Science)

"Occasional scheduling of final examinations in two rooms, splitting class and making adequate monitoring of exam difficult. Lack of Scantron reading facilities for exams. Need to standardize grading standards. (i.e. is a C truly median, what percentile is a D? Should A and D be equivalent percentiles, etc.) Problem of borderline grades in continuum of ranking." (Forestry)

The questionnaire item Cheating on exams and assignments ranked as 21st out of the 32 problems. It was marked with a 4 or 5 by 25 out of 140 faculty. There was little variation across discipline groups, but the mean response increased with increasing total class enrollments and numbers of freshman.

Respondents offered the following descriptions of successful teaching practices in relation to examinations:

"I get input and suggestions from all TAs--students can submit questions for consideration. We all (myself and TAs) meet and go over the whole exam and discuss every question before finally using it." (Anthropology)

I organize the questions into a subject matter outline. I use a mixture of true and false and multiple choice questions. I use scantron grading. I derive the grade by summation of correct answers with deductions for incorrect true-false to discourage guessing." (Forestry)

"I hand out review questions early in the course, but this can narrow their understanding." (Anthropology)

"I supply TAs with a formula for calculating weights in grading. Cheating -- I call the students in and confront them with it. Give them options depending on how serous it is. It's handled individually, very contextual, I don't go by the rulebooks." (Sociology)

"I give open book exams, there is not much cheating." (Geography)

"We do marathon grading all together of exams. Cheating--I grade their exams, they usually fail anyway. I curve the grades -- they always fail below expectations." (Mathematics)

"The problem of cheating in the final exam is helped (a little, I think) by use of Scantron forms for the answers to the exam." (Journalism)

"Cheating in exams in a crowded room: I make three sets of exams (or scramble answers three ways). It is very effective." (Music)

"Six years ago, I tried using "In Progress" grades to reduce the anxiety felt by many students in this service course as they were making their initial adjustment to the University. It is a lot of work (record keeping) but it was successful." (Chemistry)

"I break up the final exam and have TAs correct a single question across sections. So each exam is graded by 4 or 5 TAs. TAs do <u>not</u> grade their own students." (Anthropology)

"In a large lecture it is essential...That the grading be by a pre-arranged formula. That makes for an undesirable lack of flexibility, for example, to make adjustments as the course progress, or to reward a dramatic improvement in performance. The TAs can be given latitude to make adjustments, which introduces some flexibility but at the same time makes it difficult to enforce uniform standards. It is out of the question for the lecturer in charge to pay undivided attention to each assigned grade." (Mathematics)

II. Non-Teaching Issues in Conducting Large Lecture Courses

There is another set of factors or potential problems which can affect the successful conduct of large classes. Most of these factors are beyond the control of individual faculty members who are responsible for the success of a classe; they are not related to teaching technique per se, but have a great impact on whether a faculty member is able to teach a class effectively. Among these non-teaching potential problems, we include those related to the following general topics: a) classroom assignment, equipment and maintenance; b) course management, administration and paperwork; c) financial resources for teaching; d) working with teaching assistants; and e) enrollment, registration and teaching loads. Faculty members were asked to mark the degree to which they feld each of the potential problems caused difficulty in teaching large lecture courses. In addition, they were asked to recommend adminstrative actions that would improve large lecture classes.

Faculty recommendations are presented in the final section of this report. This section focuses on presenting faculty views of the nature of the non-teaching factors which affect teaching excellence in large lectures.

A. Classroom Assignment, Equipment and Maintenance

The lack of availability of appropriate space is not a problem unique to large lecture classes. Scheduling classrooms for the entire campus is a complex task where considerations of size, location, equipment, and physical plant have to be reconciled with the current limitations in the number and quality of lecture halls. All of these issues become more critical in classes with large enrollments because there are a relatively small number

lecture halls with sufficient capacity and equipment to handle them.

There were four items on the TELL questionnaire that addressed these possible problems: Unreliable equipment; Poor physical maintenance of classroom; Lack of proper equipment; Inappropriate size of classroom.

The problem of Unreliable equipment ranked ninth. It was marked 4 or 5 by 39 of our respondents (28%). Faculty gave the following examples:

> "In PSL there were bad projectors, the slide projector broke, malfunctioning microphones were a constant problem, the revolving stage sometimes didn't work." (Anthropology)
>
> "There was not a good sound system. Once I tried to use the TV thing for a videotape, but there was no soundtrack, the amplifier had been changed or something. I had to change the lecture. Another time I tried it again but the videotape was blank. Always have a canned lecture ready for when the equipment fails!" (Linguistics)
>
> "The microphone in the room didn't work, so I went to grounds facilities and got another one, but it wasn't good. Later on it was stolen. I'll buy my own microphone in the future!" (Linguistics)
>
> "...we use slides, projectors, and microphones -- God help us -- in Dwinelle something always goes wrong. This is a major problem." (Architecture)

A related issue was the problem of Lack of proper equipment. It ranked 14th. It was marked 4 or 5 by 31 faculty (22%). Faculty gave the following examples:

> "There were no window shades to darken the room for showing of slides and films; poor projection screen." (Geography)
>
> "We try to have all Geography courses in 141 Earth Sciences, which is fitted with maps etc. Now it is in North Hall, which lacks equipment. I can't go early to set it up because there is another class. They should equip more rooms properly." (Geography)
>
> "I like to teach this class in the large rooms in the Physics Department, but you have to fight for these rooms. They are good for doing demonstrations with lenses and instruments. Now it is in 10 Evans, which has just a stage and seats. I have to lug lots of stuff over (3 projectors, etc.) and it is very hard to set it up in 10 minutes. It is exhausting to get the equipment back and forth." (Astronomy)

"The chalk was missing, even early in the morning." (Mathematics)

Classroom equipment was a problem in large lecture courses even in disciplines that do not otherwise require special equipment, because of the need to use microphones and permanently installed audio-visual machinery.

The item innappropriate size of classroom ranked fifteenth . It was a problem shared by 30 of our 140 respondents (21%). Following are some examples:

> "A major problem is classroom assignment for time slots that do not conflict with major laboratory and studio courses. Only one classroom on campus is both large enough and has proper equipment to accomodate us." (History of Art)
>
> "Occasional scheduling of final examinations in two rooms [splits] the class and [makes] monitoring of exams difficult." (Forestry)
>
> "There are very poor rooms for sections -- sections should be like seminars, but seminar rooms are usually not available. When available, too small," (History)
>
> "100 Lewis was terrible...Enrollment exceeded room capacity, there were students on the floor." (Mathematics)

The last topic in this section concerns the poor physical maintenance of classrooms for large lecture courses. This item received a ranking of 11 out of 32 problems on the TELL questionnaire. Of our respondents, 38 reported this a definite concern. Following are some examples:

> "I am my own janitor -- I clean black boards, move chairs, turn on lights, find chalk... This is no way to start a lecture." (Biomedical Environmental Health Sciences)
>
> "Better maintenance of lecture halls is needed. In my experience: seats broken, lights not replaced, rooms extremely dirty." (Botany)
>
> "Recurring problem: janitors clean blackboards every month with a solvent that you can't erase for a week afterward." (Mathematics)
>
> "The physical plant was the worst problem. This must be improved. PSL was miserable. Rain dipped on us all winter." (Anthropology)

B. Management, Administration and Paperwork

The job of conducting classes with large enrollments is complicated by the task of organizing the activities of numerous teaching assistants, keeping track of official forms and data, and accomodating students who have special requests. While most experienced faculty members have developed the management, administrative, and bookkeeping skills to deal with these tasks satisfactorily, two issues in particular remain of real concern to them. These are: Dealing with incompletes, make-up exams or grade change requests (ranked 3rd) and writing recommendations for students you don't know (ranked 12th).

Respondents described their experiences with these items:

> "My biggest administrative problem is people wanting make-up exams and incompletes." (Mathematics)
>
> "Since so much time is spent on management and administration of a large course, it is much more difficult to keep up with the high level of preparation needed to give 30 lectures over a semester. This really works against developing new courses." (Psychology)
>
> "Directing and coordinating the TA's -- and responding to any problems they may have with students, grading, etc. can take a lot of time." (Psychology)
>
> "Organization and grade-keeping. In my class I have had approximately 225 students each with over 10 separate sheets to grade, a midterm and a final, 2,300 grades to enter." (Mechanical Engineering)
>
> "Too many students want to change lab and discussion sections. Appeal process is too slow, ineffective." (Computer Science)

Several faculty members described what they did to confront these headaches. Many faculty conducted weekly meetings with teaching assistants to coordinate teaching efforts, and stressed the necessity to keep all records on hand for at least three years after a large lecture course is taught. Other practices included:

"My solution (to grade change requests) has been to rely on memos from the Office of Instruction that grades can only be changed in the case of a clerical error. I check the clerical work. If there is no error, I advise the student that I am not allowed to change the grade, though if a higher administrator directed me to change it I would; however, I could at present see no reason to do so and could not recommend it in all fairness." (Paleontology)

"I tell students to take care of examination problems immediately." (Physiology-Anatomy)

"Establishing very specific priorities for lab section adjustments and being firm and fair has helped. Regrades are handled by student putting number of question on back of exam. No verbal argument is permitted. The entire exam is regraded -- scores going up and down -- with particular attention paid to explaining or correcting the grading of the disputed question." (Chemistry)

Professor Michael Wiseman, of the UCB Department of Economics, has developed a data management system specifically for use in large lecture courses. His "Bijou Teaching Support System" requires several computer terminals which can be accessible to the professor, the TA's and the students, and so it may not be of immediate use in "computer - poor" departments. The following is exerpted from the abstract of Professor Wiseman's paper of March 26, 1985, "The Bijou Teaching Support System":

"The system integrates class data management functions operating under the widely - used SAS statistical analysis program with PROFS, the IBM "Professional Office System". The system supports a wide variety of teaching and course - management functions, including communication, enrollment, teaching assistant record keeping, performance feedback, document preparation, and central archiving of class data and records."

Although the system is still in the testing phase, its potential usefulness is apparent. All clerical records can be kept on-line and easily accessible; messages are sent to all TAs, who only have to check for them periodically; and hand-outs prepared and disseminated. TAs can ask questions and send information to the professor without waiting for office hours, and students can type in their own comments and questions anonymously or with a code name of their own choosing so they can also receive responses to their

messages. It seems to be an answer to some of the nightmares expressed by teachers of large lecture classes. We have been told that several other departments use similar data management systems.

C. Funding Resources for Teaching

Our initial interviews suggested that many faculty members teaching large lecture classes felt there was insufficient funding for teaching materials and support personnel. The cost involved is much greater than for courses with small enrollments and even producing handouts for a semester's distribution can run into significant expenditure. The TELL survey revealed that out of four items related to financial resources for teaching, insufficient TA funding was by far the most acute problem. In fact, this ranked fifth out of the 32 potential problems on the questionnaire.

The other funding resource items were: Not enough money to pay for handouts (marked 4 or 5 by 30 faculty, ranked 16th); Not enough money to pay for projection materials, films, etc. (30 faculty marked it 4 or 5, ranked 17th); Insufficient TA training resources (marked 4 or 5 by 16 faculty, ranked 28th).

Out of 59 comments on these topics, 36 were requests for additional TAs. We received four suggestions that readers ought to be permitted to lead discussion sections, apparently from faculty members who have been unable to get TAs for their courses. One respondent even requested a lecturer to supervise and integrate the activities of those involved in one enormous class that enrolled 850 students and required 30 TAs, 6 faculty and between 3 and 5 administrative and clerical staff workers! Other responses included:

"The major problem in teaching large lecture classes in the English Department is that there is rarely any money for sections: our TA budget goes, for the most part, for TAs for the Reading and Composition requirement courses (1A and 1B). Even when students do not know that something important is missing -- that is, even when the course is going well -- there are in fact serious pedagogical problems." (English)

"Our major problem is that we have not been able to get any funds to hire TAs for the lower division survey course we initiated last year. The students are eager for discussion sections, but we obviously can't have them without TAs." (Environmental Science)

"In a classroom of 200 to 300, I have NO TAs. Only inexperienced and underpaid readers, with low morale. I would like TAs with real sections. As it is I give two sections myself each week." (History)

"The major problem in English: no TAs. NONE. O. ZIP. Therefore, no sections at all. Only readers -- overworked and underpaid." (English)

"Allocation of resources is a problem. Dollars do not follow students. Deficiencies and inequities result." (Computer Science)

"No problem is more important, I feel, than having more funds for more TAs." (History of Art)

It is apparent that the TA shortage is more severe in some departmental groups than in others. Among those well represented in our sample, percentages of faculty marking 4 or 5 on the item, Too few TAs, varied from a low 15% in Physical Science and Math to a high of 63% in Humanities. The Social Science faculty response was 43%.

There was little variation in faculty response with changes in total class enrollment.

In the absence of adequate TA funding, faculty members reported taking various measures, including teaching discussion sections themselves, making sections voluntary, and using readers to conduct sections. One faculty member hit on a more original solution, which he calls "peer tutoring:"

"I have experimented with voluntary tutors (students taking or having taken the course who have motivation to help others and who have high

groups of students who have learning difficulties and those who volunteered to help were very happy." (Computer Science)

Although the TA shortage is the most critical problem of financial resources for teaching, some faculty also expressed concern over the items Not enough money to pay for projection materials, films, etc. and Not enough money to pay for handouts:"

> "I would like to make more use of video tape. I could teach a lot more in a limited time with its imaginative use. There should be resources to collect such materials and use them in a more organized way." (Sociology)
>
> "Materials for handouts are too expensive. The Linguistics Department can't afford many of them, week after week. Need more money. I pay for films out of my own pocket. There should be an extra budget for things for classes." (Linguistics)
>
> "There should be a pool of money to which those teaching large classes might apply for unusual forms of assistance -- production of a reader, non-TA-type help with grading or holding special discussion sections, etc." (Paleontology)

Again, these budgetary constraints are unequally distributed across disciplinary groups: One third of Social Science faculty expressed concern about these problems, but only one out of 27 faculty in Physical Science and Math indicated a similar concern.

D. Working with Teaching Assistants

In general, this study revealed a high level of satisfaction with their teaching assistants among teachers of large enrollment classes. Graduate students are responsible for leading discussion and review sessions, conducting laboratory sections, holding office hours for individual tutoring, helping students write their papers, and grading papers and exams. In many cases, TAs provide the only face-to-face contact students have with an instructor in large lecture courses, and students rely heavily upon them

for learning course material. Because of this involvement with students, TAs also function to provide faculty members with important feedback from the students about the course.

We included six questions relating to potential problems with teaching assistants on the questionnaire, four of these received very low rankings because they are not believed to be problems by most faculty members. These are:

- TAs with poor English language skills (rated 27)
- Insufficient TA Training Resources (rated 28)
- Dissatisfaction with TA Selection Procedures (rated 29)
- Poor Lecture Attendance by TAs (rated 30).

It is worth noting that the faculty who believed that poor English language skills among TAs is a problem tended to be in the Physical Science and Mathematics area, and the professional schools.

Additional issues about TAs were raised in responses to our open-ended questions. They fall into three categories: 1) Communication with a group of TAs and management of their activities; 2) TA competence and performance; and 3) Difficulties getting a sufficient number of them to do the job. The latter issue was discussed in the preceding section on financial resources, so here we will concentrate on the first two categories.

Most of the comments and suggestions we received regarding TAs concerned communication and management. Some professors structure this relationship highly and work very closely with their TAs:

> " Another professor and I taught Math 50A (team effort) to t=1000 students. The <u>new</u> feature, which took us by surprize, was the difficulty of dealing with 21 TAs!! The weekly meetings were necessary but not as successful as we had hoped. <u>Monitoring</u> the performance of these 21 TAs from week to week was a big task. Some TAs resented our intrusions but the good ones came to realize that their prowess would not go unrecorded. Actually, departments <u>could</u> monitor TAs almost

not go unrecorded. Actually, departments could monitor TAs almost independently of the course and its material. If this were taken out of faculty responsibility that would be an improvement." (Mathematics)

"The problem: Instructor-TA coordination
Solution: (1) Write out lecture notes in prose;
(2) Xerox each week's notes in advance and distribute them to TAs along with (a) a list of suggested questions and discussion topics; (b) a set of background readings that would illuminate the suggested topics and;
(3) a weekly staff meeting at which the next week's topic is discussed so that all TAs will understand what I expect them to cover and what I would like them to accomplish in their sections." (Political Science)

"I like to visit the sections. We all meet once a week to talk and plan, and they (TAs) are asked to participate fully in planning. We arrive at the general stuff in the beginning, e.g. homework, quizzes. I ask them to tell me about the nature of the questions they get in section. TAs make suggestions for improving my teaching -- sometimes good ones." (Astronomy)

"Maintaining a close and continuous relationship with TAs, frequent meetings, advice on how to teach. Selecting TAs myself a semester ahead of time and coaching them." (Political Science)

Other professors leave their TAs more freedom to teach on their own as semi-independent instructors. These faculty members often express confidence in the knowledge and abilities of their TAs:

"I've had no problems with teaching assistants. My policy is to tell them in the beginning that they are independent instructors with complete responsibility and that they can give their own points of view in their sections. Most TAs in this department are advanced students, back from fieldwork, and are often just as qualified as the instructor. I don't monitor them, don't look over their shoulders, and have never had any problems." (Anthropology)

"I leave them to do their own sections, as long as they achieve the goal of covering the homework." (Mathematics)

"A weekly meeting to decide what to do next. They (TAs) voted to write the final exam themselves, and I edited it. I tried to choose TAs who are strong in areas where I am weak, so they can clarify the lectures in section." (Linguistics)

"I run a loose ship. I define the broad limits of what they should do in sections such as not to repeat the lectures. They have latitude. We meet occasionally. They have no special training, but are experienced. I don't even want them all to come to lecture: they send a representative." (Mathematics)

Not all those teaching large enrollment classes express this much confidence in the competence and performance of their teaching assistants. The questionnaire item, TAs who do not know the subject as well as you would like was rated a definite concern by 26 faculty and ranked 19th out of the 32 items. While this does not indicate a major concern with this issue, it appears to be a problem for some. We received only one negative comment on this topic:

> "It all depends on the particular TAs. Sometimes they're from Physics or Math instead of Astronomy. Now, only one out of three TAs here is an Astronomy graduate student. This is a problem. So much depends on the attitude of the TAs. Some are wonderful to work with, others are less interested in teaching." (Astronomy)

However individual professors work it out, the relationship between the instructor and the TAs is a pivotal one for large enrollment classes. Some respondents offered descriptions of how they maintain a positive climate:

> "Low TA enthusiasm was a problem at one period with my course, but I have since had better results by carefully selecting my TAs and by encouraging them, taking them out to lunch, etc." (Geography)

> "Weekly staff meetings with TAs and undergrad lab assistants. Party (barbeque in Spring) at end of semester." (Computer Science)

E. Enrollment, Registration and Teaching Loads

We did not include items on the questionnaire that specifically addressed these issues, yet 22 respondents volunteered relevant comments. All but one of those writing about class size wished for a policy change to limit enrollments, with some noting that this would require hiring additional faculty:

> "I am simply against teaching things like calculus in groups of over 100 (we now have a few mega-lectures of 500). Even 100 is too many for there to be any real dialogue with the class. I believe this is necessary for good teaching of such a subject." (Mathematics)

"It is impossible to move to no large lecture classes. Set a limit. 400 students is too large. We could teach more classes with 200 students but this would create staffing problems. In the Math Department, enrollments have been increasing 20% per year for the past few years. We are operating beyond capacity." (Mathematics)

We also received nine comments and suggestions relating to registration procedures. Seven of these were specifically about the new ACE system, including:

"Large numbers of students not enrolled by ACE -- but left on the waiting list. These students were not even aware they were on the waiting list." (Mathematics)

"Enrollment under ACE was a problem in the number of adjustments needed. Everyone eventually got in, but the number of hand adds was enormous. The program should be iterative so at least one second pass is made. I was immediately able to accomodate everyone within the original configuration given to ACE -- the computer should have done it. I was more efficient with cards on my office floor!" (Chemistry)

Two other comments related to registration may be of interest to policy makers:

"A problem is people coming into your class 4,5,6 weeks into the term. Also, people taking another class at the same time as yours. (These of course are not peculiar to large lecture courses, but they are roundly abused, especially at the lower division level.)" (Paleontology)

"There must be an end to students being permitted to enter classes as late as the 3-5th week. It is disruptive and unfair." (Paleontology)

A final set of six responses were pleas for giving extra workload credit to those teaching large lecture courses in recognition of "the tremendous effort required to make these courses effective". (Biomedical and Environmental Health Sciences)

"Large lecture courses are more draining on time and energy -- some consideraton should be made on lecturer load concerning number of students served -- numbers do make a difference in load." (Chemistry)

"Instructors giving a large lecture course should be given a lighter teaching load so as to enable them to devote more time to the undergraduates." (Geography)

In fact, policies and decision-making about teaching loads and who teaches the large lecture classes vary from department to department.

III. SOME POSITIVE FACTORS

The emphasis in this report, so far, has been on the problems and difficulties in teaching large lecture courses as seen by the faculty who teach them. This emphasis is for the purpose of improving instruction, by identifying points of difficulty and successful or recommended responses to them. Indeed many faculty were quite articulate about the values of large lecture courses and the personal satisfactions inherent in teaching them. We included open-ended questions on the TELL questionnaire that asked about the academic advantages of the large lecture format and about the sources of satisfaction the respondent got from teaching large lecture classes.

A. Advantages of the Large Lecture Format

The most obvious advantage of classes with large enrollments is that they provide the most efficient use of faculty members' time while accomodating great student interest in particular courses. Not surprisingly, this was the most frequently cited feature in our survey responses. Out of a total of 103 responses to this item, 32 indicated that this was a principle advantage. Here are a few of their comments:

> "It reduces the load on one's colleagues by allowing one lecturer (and many TAs) to do the work of several professors." (Political Science)
>
> "The lecture reaches more students per hour's work." (Zoology)
>
> "...economy of faculty time in preparing material." (Biology)
>
> "It's efficient and serves the needs of <u>all</u> students who want to be able to take your class." (Psychology)

The second most frequently cited advantage (15 respondents) was the fact that large lecture classes afford the possibility for great numbers of students to be exposed to high-quality teaching and senior faculty

members:

> "Our best teachers can reach and influence a large number of students." (Chemistry)
>
> "The advantage is that an excellent professor can be put before 200 students. It is difficult to find 10 excellent instructors for 10 classes of 20 each." (Mechanical Engineering)
>
> "Provides students with an opportunity to see how one scholar organizes masses of information in an orderly way..." (History)
>
> "The large class makes good use of scarce lecturing talent"..."Most faculty are recruited for research fame and many are hopeless at lower division teaching whether it be to 10 or 500 students." (Economics)
>
> "In principle, the very best lecturers and, among these, the most eminent scholars can give a quality, an insight, and a coherence to their presentation that ought to be the hallmark of education at Berkeley." (Chemistry)

The next most frequently cited advantage is closely related to this. Fourteen respondents mentioned that this format allows them to reach a larger audience than would otherwise be possible:

> "It permits us to introduce more than three times the number of students to our field than would be exposed to it otherwise." (History of Art)
>
> "Ability to reach large audiences and 'sell' one's subject to them." (History of Art)
>
> "The facility to perform elaborate experimental demonstrations before large groups of students." (unknown)

The specifically financial efficiency of large lecture courses was mentioned by 12 respondents. In many cases, these remarks were accompanied by reference to their time efficiency for faculty members:

> "Given the budgetary constraints, it allows more students to hear a relatively competent professor." (Philosophy)
>
> "Cost-effectiveness. This is, it seems to me, the single most important factor." (English)
>
> "There are no academic advantages; the advantages are all concerned with scale: numbers, costs etc." (History)

More positive views were expressed by the 11 respondents who claimed that courses with large enrollments inspire better teaching:

> "Brings out your best as a teacher. Forces you to consider issues of teaching you would not otherwise confront. Forces you to be dramatic to sustain students' interest." (History)
>
> "Large lecture courses are good courses. The teachers have to be prepared..." (Linguistics)
>
> "Incentive to prepare good lectures synthesizing the material." (Sociology)
>
> "They lend themselves to creative teaching and entertainment." (Paleontology)
>
> "For small classes I rarely prepare. One can put burden on students. Large class makes it worth writing handouts, preparing demonstrations, lab exercises, etc. even rehersal! Also, the <u>best</u> students in a larger course are brilliant." (Computer Science)
>
> "Certain lecture situations can drive the professor to organize and clarify his materials with an intensity and efficiency that the seminar does not encourage." (English)

The large lecture can be a vehicle for creating a common ground for a diverse group of students. We received 7 responses citing this advantage:

> "Being a lower division requirement, it provides basic training for potential majors and all students going into our upper division courses, so that the level of the latter may be elevated and specific courses can be more knowledgeably selected, etc." (History of Art)
>
> "Gives all students a common grounding in the basics (mine is a required introductory course)." (Architecture)
>
> "Standardization of course content." (Linguistics)

The following three advantages were each mentioned by 6 respondents: 1) provides financial support and teaching experience to graduate students; 2) these courses are broad and reach a wide audience; and 3) it is a suitable format for presenting introductory level survey material. Here are some examples:

1. "Head-count giving us the ability to support more graduate students or TAs!" (Zoology)

"Provide experience and employment for TAs" (Political Science)

2. "They allow introduction of a subject to be presented broadly to a broad audience." (Paleontology)

   "Only in a large lecture format can a student select cross-over subjects that will enrich his curriculum." (Journalism)

   "Getting to reach a tremendous variety of students with a subject matter they ordinarily would not have had a chance to get." (Paleontology)

   "I like them because they are broad; this fits my idea of a general liberal arts undergraduate education." (Geography)

3. "Good for general interest courses and courses used to satisfy breadth requirements. One can have a broad spectrum of questions that tend to show up both strengths and weaknesses in arguments and reasoning." (Paleontology)

   "Efficient way of getting central ideas and some facts across in basic, foundation courses." (Political Science)
   "For lower division, non-major declared students, they provide an opportunity to get a 'feel' for the field." (Psychology)

   "No disadvantage in presenting 'boiler-plate' material to large numbers." (Biomedical and Environmental Health Sciences)

   "The only suitable method of introducing a large number of students to a subject." (Astronomy)

Three to five respondents each cited the following advantages. Each is followed by examples:

- Large lecture classes free faculty to concentrate on more small-enrollment courses and on research:

  "I do think that if running very large classes means other small classes are possible I think it's desirable." (Political Science)

  "Free up faculty to enhance graduate and undergraduate programs." (Mathematics)

  "Provide more time for research." (Statistics)

- The lecturer can exercise great control over the presentation of course material:

  "Giving the straight truth, not just textbook approximations,

giving a sense of proportion for judging the importance of various special topics, pacing the learning process at a reasonable rate." (Mathematics)

"An open, honest, well-founded interpretation of the material may be presented, one that encourages critical thinking, analysis of the assignment, and an effort to think through and perhaps to rebut the offered interpretation." (Social Science)

"More consistent control over course content and course level." (Chemistry)

- Large classes can have good atmosphere, and enthusiasm can be very infectious with large numbers of students:

  "...the opportunities to generate group enthusiasm -- peer pressure can be put to effective use to generate involvement." (Paleontology)

  "If enthusiasm can be genreated in even a few students, there often is a marked "spill-over" to those individuals generally less inclined to learn the material." (Botany)

- Some students like big classes, partly because the anonymity of big classes puts less pressure on them to respond and expose their weaknesses:

  "Beginning students like the anonymity." (Anthropology)

  "I think students like a mix of bigger and smaller classes. I don't think they mind a large number of others in the class." (Anthropology)

The following advantages were mentioned by only one or two respondents:

- The professor's work load is lightened because teaching assistants do the grading:

  "TAs do all of the grading !!!" (Geography)

- Large enrollments make it easier to find funding for special teaching materials, films, and guests:

  "It allows access to greater resources such as demonstrations and special lectures." (Physics)

- Large courses encourage independent learning on the part of students:

  "Consistency in material covered/examinations/grading encourages students to be aggressive -- perhaps good preparation for real world competition. The assertive ones are at a tremendous advantage. Also, encourages independance of learning since much less help is available." (Chemistry)

- Students are exposed to the different approaches of lecturers and section teachers:

  "Acquainting a large audience with different methodologis and styles of teaching." (History of Art)

- The help provided by Teaching Assistants also makes the lecturer

  "free...to concentrate on the extremely good and extremely poor students." (Biomedical and Environmental Health Sciences)

B. Sources of Satisfaction

Many faculty members enjoy (at least occasionally) teaching large enrollment classes. While some educational reformers recommend increased external rewards and honors as the best method to encourage lecturers' enthusiasm for teaching them, we found that faculty members derive their own satisfaction from a job well done.

We received 94 responses to the question, What are the specific sources of satisfaction for you in teaching large lecture classes? The most frequent response (13) referred to the excitement and drama of large lecture performances, and the chance for faculty to display their showmanship. Here are some examples:

"It is a real challenge to be a performer as well as a teacher. I like the challenge of being entertaining." (Business Administration)

"I take some pleasure in performing for a large audience --- there is a kind of rush of energy that one doesn't always get from a small class." (English)

"Rock star fantasy fulfillment?" (Economics)

"I find there's a piece of performer in me that likes lecturing to a lot of students." (Political Science)

Nearly as many faculty members (12) mentioned the feeling of satisfaction they get when they have given a a really good lecture. Many of these were especially thoughtful responses:

"Those rare days when one's notes and meditations en route to class result in a dwelling upon the subject, a consecutive unpacking of thought, implication --- a process students can see occurring. Exciting to me, valuable to them." (English)

"Occasionally you touch the right chord and have the entire class in the palm of your hand." (Geography)

"The rare lecture that hits exactly the right tone and level of complexity, on a topic of interest to students." (Zoology)

"I enjoy lecturing when I feel that the intellectual excitement of the subject is getting across. It is really gratifying when a lecture hall containing 550 students with only 500 seats is perfectly quiet during a lecture, everyone attentive and interested. That makes it all worthwhile." (Chemistry)

The same number of respondents said that they enjoyed the challenge of synthesizing and communicating a complex body of knowledge. Several of these mentioned not only the challenge, but the satisfaction of doing so successfully:

"Being able to teach a majority of the class something difficult and have them understand it." (Physiology-Anatomy)

"Organizing a complex body of material into a coherent lecture format." (Botany)

"I find it a challenge to figure out ways of presenting the basic material in my field in a a way that makes it clear but still interesting." (Political Science)

Eleven faculty members who teach large lecture courses cited each of the

following sources of satisfaction:

- Positive teaching evaluations, students' comments and the appreciation they show for the lecturer's efforts:

  "I receive many notes of appreciation and I meet former students in almost every town I visit in America or in Europe." (Music)

  "Getting feedback on topics and lecture style from a large number of students." (Psychology)

  "Students really appreciate any personal attention given." (Chemistry)

- Opportunities for contact with students, many of whom are in other fields; in large classes there are likely to be some very good students:

  "Coming in contact with a wide range of student interests and backgrounds." (Paleontology)

  "Better chance that there will be some interesting students." (Computer Science)

  "I like meeting and teaching a large variety of students." (History)

- The chance to influence a large number of students:

  "If it works, you have been able to enlighten more students than in a smaller class." (Biochemistry

  "Knowing that one has broadened the appreciation of a great number of students." (Music)

We received 8 to 10 responses citing the following enjoyable aspects of teaching classes:

- Introducing many students to one's own field, which is often a very new perspective for them:

  "After learning anthropology, they can now see the world differently." (Anthropology)

  "Communicating a valuable general perspective to a lot of students. By the end they take it more seriously." (Sociology)

"Worthwhile to provide for many future citizens of the country a vision of what contemporary astronomers are trying to do. Show the truely remarkable discoveries." (Astronomy)

- The high level of interest and response shown by students:

  "A good lecture is like a good performance for an actor. The audience participation by active listening is a joy." (Physiology-Anatomy)

  "Alert, friendly reaction of Berkeley students is unlike that at other institutions I have visited. Our students are the best part of our University. They are accustomed to working and most are on their toes." (Geography)

- Turning students on, getting them interested in a subject:

  "I like to see a lot of eager students becoming interested in a subject they did not even know existed before they took the course." (Philosophy)

  "Being able to turn 20 or 30 students on to a body of material and see them improve their powers of creative and critical thinking." (Paleontology)

  "The satisfaction of exciting a lot of people, when the opportunity arises, with an inculcation that happens to sink in." (Physics)

  "Seeing faces light up." (Physics)

There were quite a few additional sources of satisfaction for large enrollment lecturers that were pointed out by only one to five of our faculty respondents. These comprise the following list:

- the fun of teaching beginners
- reviewing the fundamentals of one's field
- the opportunity to develop one's lecturing skills
- the pleasure of lecturing; some prefer it to discussion
- not having to grade papers; TAs perform this task
- getting to perform interesting experimental demonsstrations with laboratory apparatus in class
- stimulating students to ask questions and challenge points made by the lecturer

- getting a lot of information across
- inventing successful teaching techniques
- visibility among the student body.

Finally, one faculty member expressed a feeling that epitomizes the joy of teaching:

> "I can show students I do care and I find learning exciting at any age. We all thrive on positive human feedback at any level. The more the more satisfying. We never have enough." (Physiology-Anatomy)

This statement offers hope that despite the many obstacles, high quality teaching and learning can take place in the large lecture hall.

Conclusions and Recommendations

"What ever positive things you can say about higher education are true at Berkeley -- somewhere. Whatever negative things you can say about higher education are true at Berkeley -- somewhere," as somebody once said in summing up education at Berkeley.

The preceding report summarizes the expressed beliefs of 140 faculty members about one aspect of education at Berkeley -- the factors which affect teaching excellence in large lecture classes. It is apparent that they differ widely in their beliefs about the positives and negatives in teaching these classes depending on: 1) their differing expectations; 2) their differing objectives; and 3) their differing experiences.

The one thing they come closest to agreement about is the factor of Discomfort in facing a large audience of students. It was not a serious concern for 133 (95%) of our 140 ladder faculty respondents. The diversity of student levels of ability was said to be a definite concern by half (47%) of our faculty respondents; only 10% felt that it was not a concern.

Different groups of faculty expressed concern about the importance of of different factors in conducting and teaching large classes as viewed from their place in the university. One-third (36%) of them felt that there were too few TAs particularly those in the Humanities. In contrast, one-third (36%) of them believed this was not a problem from where they stood.

Faculty were asked about what they believed would improve large lecture courses. Their recommendations are presented in the following material. It summarizes faculty views of "What would help large lecture courses?"

- Establish a pre-semester workshop for first-time large lecture course teachers to help them in planning and preparing a syllabus along with class materials and handouts. It should include demonstrations and practice at different approaches to teaching large lecture classes.

- Arrange for a brief seminar about "How to construct and grade exams for large lecture classes" Student performance on examinations is one measure of how well a class has succeeded.

- Convene an interest group for first time large lecture course teachers. Such a group could draw upon experienced teachers to discuss how they successfully taught large lecture classes. The group should not meet too often. Out of our 140 faculty, 56 (40%) were in favor of starting such a group.

- Develop Teaching Idea Packets (TIPs) for Large Lecture Classes. Many of the problems in conducting large lecture classes are dealt with successfully by some of our faculty. Teaching Idea Packets (TIPs) are simple four-paged folders which desribe successful practices in dealing with a single aspect of teaching. They make it possible for faculty to consider a much broader range of options in their teaching without requiring very much of their time.

- Involve more senior faculty in teaching large lecture courses. Then students, particularly freshmen and sophomores, could observe how experienced scholars in a field go through the thinking process as they approach intellectual problems, particularly conceptual problems, in their discipline. This would enable them to observe

one of the things that has made Berkeley a great university.

- A related recommendation, senior faculty members who have difficulty teaching a beginning course using an information giving approach could demonstrate how a scholar in the discipline thinks about particular problems or issues. He/she could select 15 topics and spend a week on each. Each issue presentation could be treated at 2 or 3 levels of difficulty: easy, medium, or hard. Previous research has found that redundancy reinforces learning.

- Rewrite the large lecture course descriptions published in the catalogue to present a fuller and more unique description of such courses. Course descriptions might include, for example, efforts that will be made to give students some activity other than sitting passively; the thinking skills beyond sheer memorization that will be exercised; the performance that is expected of students.

- Publish a brief Guide to Writing Course Descriptions prepared by the Committee on Courses and distributed to all departments.

Following is a list of recommendations for changes related to non-teaching functions in large lecture classes.

- Upgrade the equipment and physical maintenance of rooms used for large lecture courses.

- Establish a better system for matching large lecture classes to appropriate sized rooms and equipment.

- Provide funds to departments for hiring course managers for very large courses. The course managers should possess the management and administrative systems skills needed to set up student-centered

systems for handling many of the non-teaching functions which are critical to successful conduct of a large lecture course. This would permit faculty members to concetrate their energies on their teaching functions.

- Support the development and departmental adoption of data management systems to do the clerical work of large lecture courses. The Bijou Teaching Support System developed by Michael Wise is an example.

- Provide a pool of money that large lecture teachers can apply to for assistance with unusual class expenses.

- Provide adequate funding for more TAs. Fifty-one (36%) faculty felt that too few TAs was a major concern. This is especially a concern among Humanities and Social Science faculty.

- Set a limit on enrollment in large lecture classes. Some faculty felt that, although large lecture classes are needed, there should be a ceiling on class size of 200 to 400 students.

- Improve the new Advance Class Enrollment (ACE) system. Several faculty members reported glitches in ACE. The reader is reminded that faculty were reporting experiences from Spring of 1985.

- Instructors of large lecture classes should be given a lighter teaching load. Large lecture classes do require more time and energy. Some departments, but not all, do make teaching load adjustments.

APPENDICES

A. The Questionnaire to Faculty

B. Frequency Distributions of Responses to Likert Scale Questions

To: Faculty who teach large lecture courses

From: Robert C. Wilson
Chief of Research on Teaching Improvement and Evaluation

Under the auspices of the Council on Educational Development, we are doing a survey of what Berkeley faculty recommend as ways of improving large lecture course instruction (100 or more students enrolled). In interviews with twenty faculty teachers of large lecture courses a number of changes have been suggested to improve large lecture courses. Now we are trying to determine the views of a wider sample, including all faculty members who have taught large lecture courses during the last 2 years.

We will write a report about what Berkeley faculty say are ways that teaching large lecture courses could be improved including recommendations to Berkeley administrators that faculty tell us about. The report will also be sent to faculty who return this questionnaire.

It has been suggested that the campus initiate a brown-bag lunch group at which teachers of large lecture courses could discuss issues involved in teaching such classes. The name Century Club has been suggested, the only membership requirement -- teaching a class of 100 or more students. Should such a group be started? _____ Yes _____ No

Comments:

Following is a list of factors that some Berkeley faculty members say are problems in teaching large lecture courses. Please circle to what extent, in your view, they have made teaching large lecture courses difficult.

	not a problem				a major problem	Not Applicable	
Diversity of student levels of ability . .	1	2	3	4	5	n/a	[17]
Low student interest in required courses. .	1	2	3	4	5	n/a	
Lack of feedback from students	1	2	3	4	5	n/a	
Unreliable equipment (e.g. microphones, projectors,...)	1	2	3	4	5	n/a	
Student reluctance to ask questions in class	1	2	3	4	5	n/a	
Low attendance at office hours	1	2	3	4	5	n/a	
High level of organization required to lecture to a large group	1	2	3	4	5	n/a	
Not enough money to pay for hand-outs . . .	1	2	3	4	5	n/a	
Not enough money to pay for projection materials, films, etc. . . .	1	2	3	4	5	n/a	
Knowing how well students are understanding	1	2	3	4	5	n/a	
Low lecture attendance by students	1	2	3	4	5	n/a	
Superficiality of topic coverage due to breadth of course	1	2	3	4	5	n/a	
Lack of proper equipment in assigned classroom	1	2	3	4	5	n/a	
Inappropriate size of classroom	1	2	3	4	5	n/a	
Poor physical maintenance of classroom . .	1	2	3	4	5	n/a	
Writing recommendations for students you don't know	1	2	3	4	5	n/a	
Low general knowledge among students . . .	1	2	3	4	5	n/a	[33]
Too few TAs	1	2	3	4	5	n/a	
TAs who do not know the subject as well as you would like	1	2	3	4	5	n/a	
TAs with poor English language skills . . .	1	2	3	4	5	n/a	
Insufficient TA training resources	1	2	3	4	5	n/a	
Poor TA lecture attendance	1	2	3	4	5	n/a	

	not a problem				a major problem	Not Applicable	
Dissatisfaction with TA selection procedures	1	2	3	4	5	n/a	
Lack of coordination between lecture and section teaching	1	2	3	4	5	n/a	
Cheating on exams and assignments	1	2	3	4	5	n/a	
Dealing with incompletes, make-up exams, or grade change requests	1	2	3	4	5	n/a	
Low level of student reading and writing abilities	1	2	3	4	5	n/a	
Class lists arriving too late	1	2	3	4	5	n/a	
Inaccurate class lists	1	2	3	4	5	n/a	
Excessive paperwork in grade reporting. . .	1	2	3	4	5	n/a	
Discomfort in facing a large audience of students	1	2	3	4	5	n/a	
Keeping students' attention	1	2	3	4	5	n/a	[48]

Please list additional problems that have not been covered.

What has been your most successful solution to one of your most difficult problems?

What broad administrative actions do you recommend that would improve large lecture courses?

What are the academic advantages of the large lecture format?

What are the specific sources of satisfaction for you in teaching large lecture classes?

NAME _____

DEPARTMENT _____

Please return this form in the enclosed envelope to:

Robert C. Wilson, TIES, 262 Stephens Hall, Campus

Frequency Distribution of Response to Likert Scale Questions

The question appears on the left, and the number of responses on a five-point scale from "not a problem" to "a major problem" appear on the right. Numbers of responses of "not applicable" and omitted responses are included in the column marked "0". There were a total of 140 respondents.

Question	0	1	2	3	4	5
Diversity of student levels of ability	3	11	22	38	31	35
Low student interest in required courses	23	30	37	30	12	8
Lack of feedback from students	4	26	35	29	28	18
Unreliable equipment (e.g. microphones,projectors)	12	53	21	15	21	18
Student reluctance to ask questions in class	5	26	29	42	23	15
Low attendance at office hours	8	34	28	26	23	21
High level of organization required to lecture to a large group	2	52	28	23	19	16
Not enough money to pay for handouts	9	64	27	10	11	19
Not enough money to pay for projection materials,films etc.	14	61	19	16	10	20
Knowing how well students are understanding	2	18	25	37	42	16
Low lecture attendence by students	2	28	49	34	22	5
Superficiality of topic due to breadth of course	10	42	38	26	16	8
Lack of proper equipment in assigned classroom	13	61	22	13	12	19
Inappropriate size of classroom	4	61	30	15	9	21
Poor physical maintenence of classroom	3	53	32	14	19	19
Writing recommendations for students you don't know	13	35	32	23	26	11
Low general knowledge among students	6	24	32	37	23	18
Too few TAs	8	42	22	17	14	37
TAs who do not know the subject as well as you would like	13	41	39	21	17	9
TAs with poor English language skills	17	55	36	16	8	8
Insufficient TA training resources	18	58	30	18	12	4
Poor TA lecture attendence	19	71	22	18	7	3
Dissatisfaction with TA selection procedures	14	76	29	9	5	7
Lack of coordination between lecture and section teaching	22	54	32	23	9	0
Cheating on exams and assignments	5	27	47	36	15	10
Dealing with incompletes, make-up exams, or grade change requests	4	16	27	37	29	27
Low level of student reading and writing abilities	4	17	32	33	30	24
Class lists arriving too late	6	61	28	19	14	12
Inaccurate class lists	7	58	37	22	8	8
Excessive paperwork in grade reporting	5	57	43	15	13	7
Discomfort in facing a large audience of students	3	102	20	8	3	4
Keeping students' attention	4	48	42	30	14	2

END

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